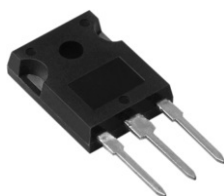
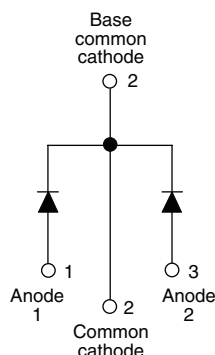


## HEXFRED® Ultrafast Soft Recovery Diode, 2 x 6 A



TO-247AC



### FEATURES

- Ultrafast recovery
- Ultrasoft recovery
- Very low  $I_{RRM}$
- Very low  $Q_{rr}$
- Specified at operating conditions
- Designed and qualified for industrial level

### BENEFITS

- Reduced RFI and EMI
- Reduced power loss in diode and switching transistor
- Higher frequency operation
- Reduced snubbing
- Reduced parts count

### DESCRIPTION

HFA12PA120C is a state of the art center tap ultrafast recovery diode. Employing the latest in epitaxial construction and advanced processing techniques it features a superb combination of characteristics which result in performance which is unsurpassed by any rectifier previously available. The HFA12PA120C has basic ratings of 1200 V and 6 A per leg continuous current. In addition to ultrafast recovery time, the HEXFRED® product line features extremely low values of peak recovery current ( $I_{RRM}$ ) and does not exhibit any tendency to “snap-off” during the  $t_b$  portion of recovery. The HEXFRED features combine to offer designers a rectifier with lower noise and significantly lower switching losses in both the diode and the switching transistor. These HEXFRED advantages can help to significantly reduce snubbing, component count and heatsink sizes. The HEXFRED HFA12PA120C is ideally suited for applications in power supplies and power conversion systems (such as inverters, converters, UPS systems, and power factor correction circuits), motor drives, and many other similar applications where high speed, high efficiency is needed.

### PRODUCT SUMMARY

$V_R$	1200 V
$V_F$ at 6 A at 25 °C	3.0 V
$I_{F(AV)}$	2 x 6 A
$t_{rr}$ (typical)	26 ns
$T_J$ (maximum)	150 °C
$Q_{rr}$ (typical)	116 nC
$di_{(rec)M}/dt$ (typical) at 125 °C	100 A/μs
$I_{RRM}$ (typical)	4.4 A

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	$V_R$		1200	V
Maximum continuous forward current <span style="float:right">per leg</span>	$I_F$	$T_C = 100\text{ °C}$	6	A
<span style="float:right">per device</span>			12	
Single pulse forward current	$I_{FSM}$		80	
Maximum repetitive forward current	$I_{FRM}$		24	
Maximum power dissipation	$P_D$	$T_C = 25\text{ °C}$	62.5	W
		$T_C = 100\text{ °C}$	25	
Operating junction and storage temperature range	$T_J, T_{Stg}$		- 55 to + 150	°C

ELECTRICAL SPECIFICATIONS (T <sub>J</sub> = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V <sub>BR</sub>	I <sub>R</sub> = 100 µA	1200	-	-	V
Maximum forward voltage	V <sub>FM</sub>	I <sub>F</sub> = 6 A	-	2.7	3.0	
		I <sub>F</sub> = 12 A	-	3.5	3.9	
		I <sub>F</sub> = 6 A, T <sub>J</sub> = 125 °C	-	2.4	2.8	
Maximum reverse leakage current	I <sub>RM</sub>	V <sub>R</sub> = V <sub>R</sub> rated	-	0.26	5.0	µA
		T <sub>J</sub> = 125 °C, V <sub>R</sub> = 0.8 x V <sub>R</sub> rated	-	110	500	
Junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 200 V	-	9.0	14	pF
Series inductance	L <sub>S</sub>	Measured lead to lead 5 mm from package body	-	8.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T <sub>J</sub> = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 1.0 A, dI <sub>F</sub> /dt = 200 A/µs, V <sub>R</sub> = 30 V	-	26	-	ns
	t <sub>rr1</sub>	T <sub>J</sub> = 25 °C	-	53	80	
	t <sub>rr2</sub>	T <sub>J</sub> = 125 °C	-	87	130	
Peak recovery current	I <sub>RRM1</sub>	T <sub>J</sub> = 25 °C	-	4.4	8.0	A
	I <sub>RRM2</sub>	T <sub>J</sub> = 125 °C	-	5.0	9.0	
Reverse recovery charge	Q <sub>rr1</sub>	T <sub>J</sub> = 25 °C	-	116	320	nC
	Q <sub>rr2</sub>	T <sub>J</sub> = 125 °C	-	233	585	
Peak rate of fall of recovery current during t <sub>b</sub>	dI <sub>(rec)</sub> M/dt1	T <sub>J</sub> = 25 °C	-	180	-	A/µs
	dI <sub>(rec)</sub> M/dt2	T <sub>J</sub> = 125 °C	-	100	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Lead temperature	T <sub>lead</sub>	0.063" from case (1.6 mm) for 10 s	-	-	300	°C
Thermal resistance, junction to case	R <sub>thJC</sub>		-	-	2.0	K/W
Thermal resistance, junction to ambient	R <sub>thJA</sub>	Typical socket mount	-	-	80	
Thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, flat, smooth and greased	-	0.50	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-247AC (JEDEC)	HFA12PA120C			



HEXFRED®  
Ultrafast Soft Recovery Diode, 2 x 6 A

HFA12PA120C  
Vishay High Power Products

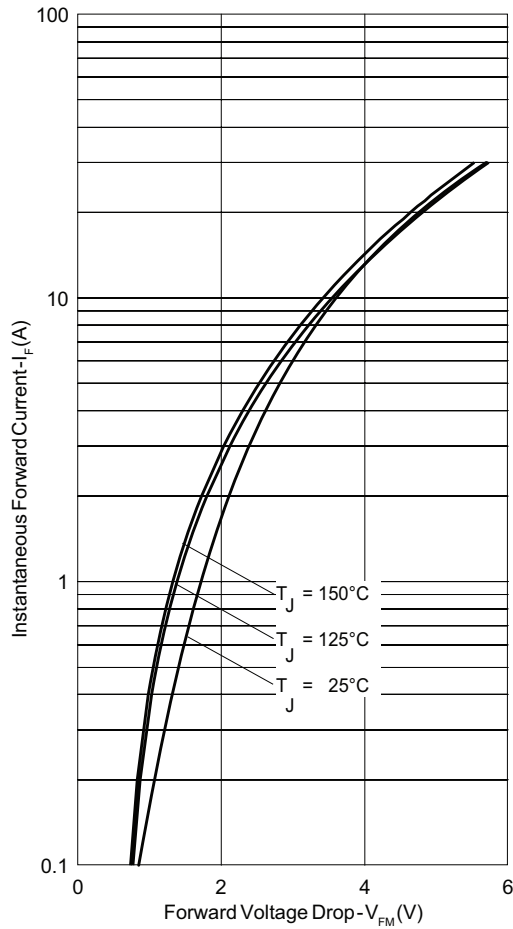


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

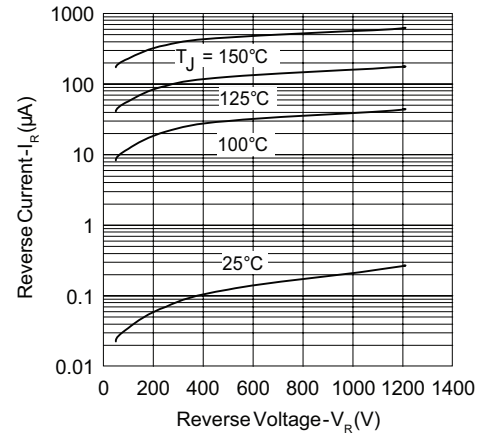


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

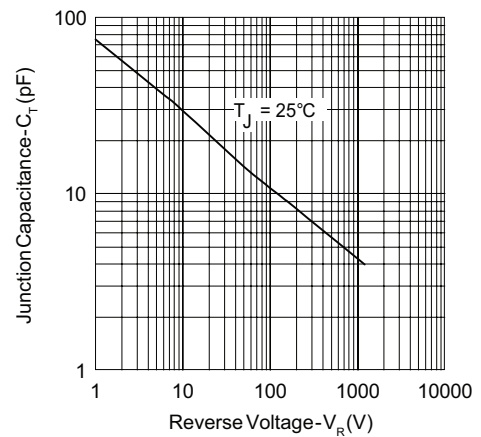


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

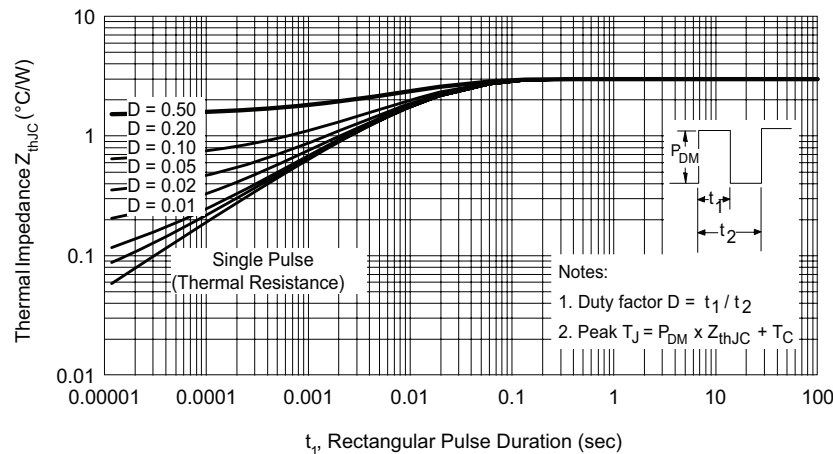


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

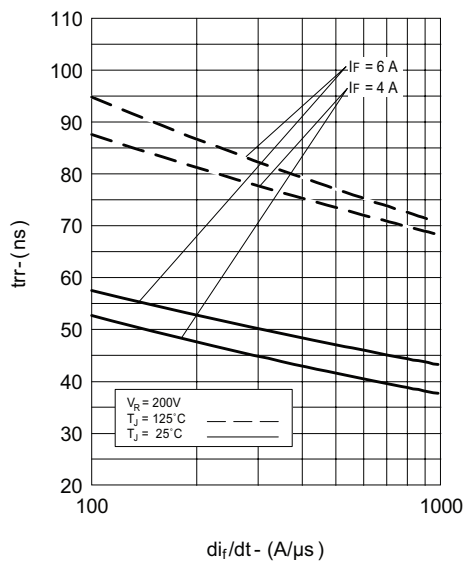


Fig. 5 - Typical Reverse Recovery Time vs.  $dI_F/dt$

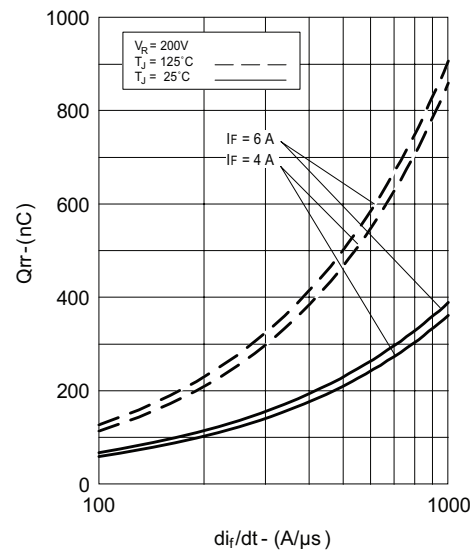


Fig. 7 - Typical Stored Charge vs.  $dI_F/dt$

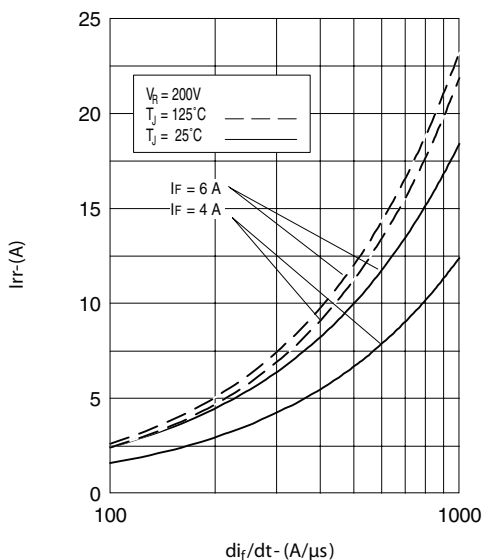


Fig. 6 - Typical Recovery Current vs.  $dI_F/dt$

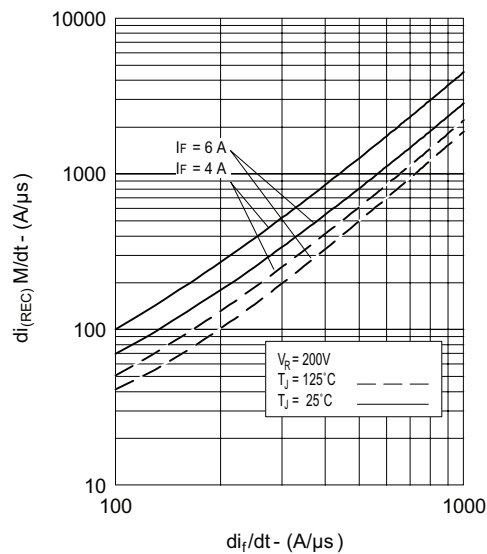


Fig. 8 - Typical  $dI_{(REC)M}/dt$  vs.  $dI_F/dt$

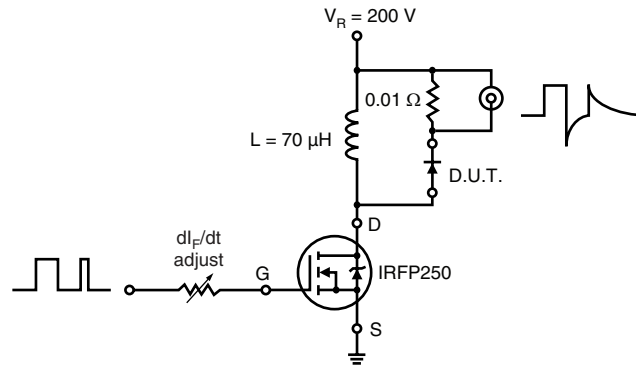


Fig. 9 - Reverse Recovery Parameter Test Circuit

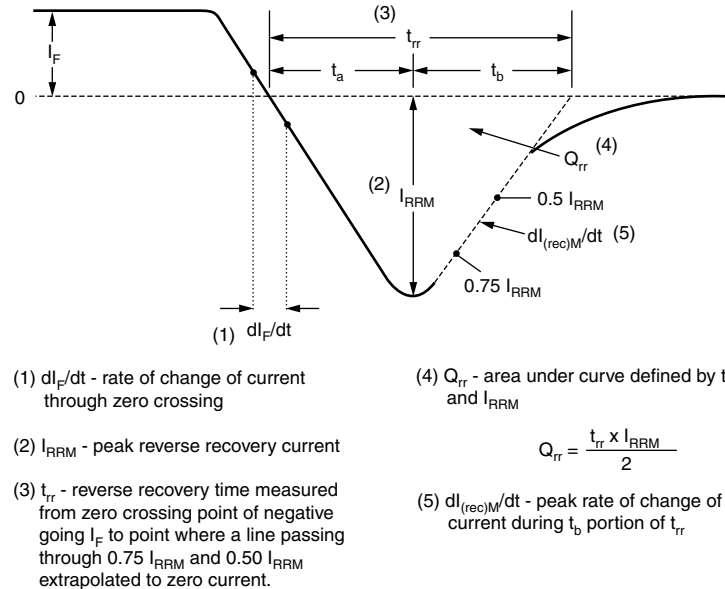


Fig. 10 - Reverse Recovery Waveform and Definitions



## ORDERING INFORMATION TABLE

Device code	HF	A	12	PA	120	C	-
	1	2	3	4	5	6	7

- 1** - HEXFRED® family
- 2** - Process designator: A = Subs. electron irradiated  
B = Subs. platinum
- 3** - Current rating (12 = 12 A)
- 4** - Package outline (PA = TO-247, 3 pins)
- 5** - Voltage rating (120 = 1200 V)
- 6** - Configuration (C = Center tap common cathode)
- 7** -
  - None = Standard production
  - PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95223">http://www.vishay.com/doc?95223</a>
Part marking information	<a href="http://www.vishay.com/doc?95226">http://www.vishay.com/doc?95226</a>



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